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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,480	04/19/2001	Hiromichi Nakata	10517/94	7265
23838	7590	05/04/2004	EXAMINER	
KENYON & KENYON 1500 K STREET, N.W., SUITE 700 WASHINGTON, DC 20005			DOVE, TRACY MAE	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary	Application No. 09/837,480	Applicant(s) NAKATA ET AL.	
	Examiner Tracy Dove	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-14 and 16-46 is/are pending in the application.
- 4a) Of the above claim(s) 27-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-14,16-26 and 43-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 4/15/04. Applicant's arguments have been considered, but are not persuasive. Claims 1, 2, 4-14 and 16-46 are pending. Claims 27-42 have been withdrawn as being directed to a non-elected invention. Claims 3 and 15 have been canceled.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/15/04 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 2, 4-14, 16-26 and 43-46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 13 have been amended to recite "the metal coating layer has a non-porous crystalline structure, resulting from melting and gradual cooling", which is not

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supported by the specification as filed. The specification does not support “a non-porous crystalline structure”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-13 and 16-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over, Yoshimura et al., US 6,291,094 in view of Cullity, Elements of X-ray Diffraction, 2nd edition.

Yoshimura teaches a separator for a fuel cell and a fuel cell incorporating the separator. The gas separator of Yoshimura comprises a metal base member coated with an electrically conductive material other than carbon (first coating layer) and with a carbon material (second coating layer) so that a sufficiently high corrosion resistance can be achieved without using a costly material such as a noble metal. The separator has a carbon material coating on a contact face that contacts an adjacent member (for example, a gas diffusion electrode) when the separator is incorporated into a fuel cell. Since the adjacent member is also formed of a carbon material, the contact resistance between the carbon material coating of the separator and the adjacent member can be reduced. Thus, the provision of the first coating layer of an electrically conductive material and the second coating layer secures a sufficiently high corrosion resistance and a sufficiently high electric conductivity. See col. 2, lines 15-34. The first coating layer may be a metal layer, such as tin, formed by shot peening. The tin coating layer does not have any cracks or pores (col. 11, lines 39-62; col. 12, lines 12-19). The separators have ribs that define

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fluid flow passages (col. 4, lines 9-23). Yoshimura teaches that a base metal separator material can be coated with tin (a base metal) and a thermal expansion graphite (carbon material) in order to secure a high corrosion resistance and reduce the production cost in comparison with a case where use of a noble metal (base metal), such as platinum rhodium or the like is used (col. 7, lines 32-55). The first coating layer is formed after a passive state coating is removed from the base member (predetermined treatment). See abstract.

Yoshimura teaches in the regions of the separators defining the gas passages (non-contact surface), the coating layer of the electrically conductive material and/or the coating layer of the carbon material may be omitted in those regions (col. 15, lines 50-65). Furthermore, since there is no need to secure an electric conductivity in the regions other than the contact faces, it becomes unnecessary to remove the passive state film from those regions of the base material of the separator (col. 16, lines 20-35). The first coating layer may include graphite material (electrically conductive particles). If the graphite material is taken up into the first coating layer, the contact resistance between the first coating layer and the second coating layer may be decreased (col. 11, lines 3-9).

Yoshimura teaches the first coating layer comprising a metal having a low melting point (of about 500°C or lower). Example of the metals for the first coating layer include tin, indium, lead, bismuth and the like. Furthermore alloys such as Sn-Pb, Sn-Be or Sn-In may be used (col. 11, lines 53-62). Note the base may be stainless steel (abstract). Both indium and lead have a lower melting point than tin. Tin, forming the first coating layer, retains a sufficiently high electric conductivity if oxidized (col. 8, lines 10-12).

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Yoshimura does not explicitly state the metal coating layer has crystal grains having an average grain size of 0.1 mm or more.

However, Cullity teaches the size of the crystal grains in a crystalline metal or alloy has pronounced effects on many of the metal or metal alloy properties (strength, hardness). The dependence of properties on grain size makes the measurement of grain size a matter of some importance in the control of most metal forming operations. The grain sizes encountered in commercial metals and alloys range from about 1000 to 1 μm (bottom of page 281-top of page 282).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill in the art would have known that the metal layer of Yoshimura would have had a grain size of 1000-1 μm because this is a typical grain size encountered in commercial metals and metal alloys. Furthermore, the instant specification states that the large crystal grain size of the claimed invention results in a nonporous metal coated layer. The metal coating of Yoshimura does not contain pores, thus one of skill would have found the claimed crystal grain size obvious in view of the teachings of Yoshimura. Both the instant invention and Yoshimura teach a nonporous tin or tin alloy metal coating for a fuel cell separator.

Yoshimura does not explicitly state the metal coating layer is successively subjected to melting and gradual cooling. However, the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. In re Fessman. Thus, whether a molten coating method, a physical vapor deposition method, a spray coating method or a shot

peening method is used to form the coating, the products as an end result are substantially the same.

Response to Arguments

Applicant's arguments filed 4/15/04 have been fully considered but they are not persuasive. Applicant argues the prior art does not teach the limitation "a non-porous crystalline structure" of amended claims 1 and 13. Note this limitation is considered new matter. Applicant states the low-melting point metal is subjected to the melting process in order to reduce the number of micro-plating defects in the metal coating layer. Reducing the number of pores in the metal coating layer is not the same as a non-porous crystalline metal coating layer.

Applicant asserts the various methods of forming the metal coating layer disclosed by Yoshimura do not result in the same non-porous crystalline structure that is achieved by the generalized melting and flow of material to eliminate defects (pores) as in the claimed invention. However, Applicant merely asserts that the methods of Yoshimura do not result in a non-porous structure without providing any evidence to support the assertion. Furthermore, Yoshimura teaches a shot peening method that results in a plating layer without a pore. The first coating metal (such as tin) is formed on the substrate surface by shot peening so that the metal spreads (flows) to form a metal plating layer on the substrate surface (col. 11, lines 41-52; col. 12, lines 12-19).

Allowable Subject Matter

Claims 2, 14 and 43-46 contain allowable subject matter. Note the claims contain new matter, the new matter rejection would have to be overcome in order for claims 2, 14 and 43-46 to be in condition for allowance.

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The following is a statement of reasons for the indication of allowable subject matter: the claims are directed toward a fuel cell separator having a base metal material. The base material has a metal coating layer having a non-porous crystalline structure coated thereon. The separator further includes an underlying coating layer formed between the metal coating layer and the base material.

The prior art does not teach a fuel cell separator having a base material with a metal coating layer formed thereon wherein the separator further includes an underlying coating layer formed between the metal coating layer and the base material.

Yoshimura teaches a fuel cell separator having a base material with a metal coating layer formed thereon. However, Yoshimura does not teach the fuel cell separator further includes an underlying metal coating layer formed between the metal coating layer and the base material.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Tracy Dove", with a stylized, flowing script.

Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745

April 30, 2004